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# MAPPING VEGETATION TYPES USING POLARIMETRIC RADAR

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Mapping vegetation types based on structure is an important potential application of radar remote sensing, which will provide valuable inputs to ecosystem studies. Because of the way radar interacts with the vegetation canopy, penetrating through some canopies at some wavelengths, it can provide a unique look at the vegetation cover.

This paper describes the results obtained using an algorithm developed to classify ground cover types into five simple classes based on polarimetric radar data as input. The five ground cover types include forest, medium vegetation, low vegetation, no vegetation and urban areas. The three vegetated classes are further divided into classes for which the double-bounce scattering mechanism (e.g. off ground and trunks) is significant and for which it is not. The implementation of the algorithm involves first calculating the relative contributions to each polarimetric radar measurement of three scattering mechanisms: surface scatter, double-bounce and volume scatter. Then a set of rules derived empirically from training sets from three polarimetric radar data sets is applied to classify into the different ground cover types.

The vegetation classifier described in this paper has been applied to many polarimetric radar images from different areas, from boreal forest to tropical rain forest, and from desert areas to agricultural regions. Results obtained so far indicate that the algorithm gives good classification performance over many different types of terrain.

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